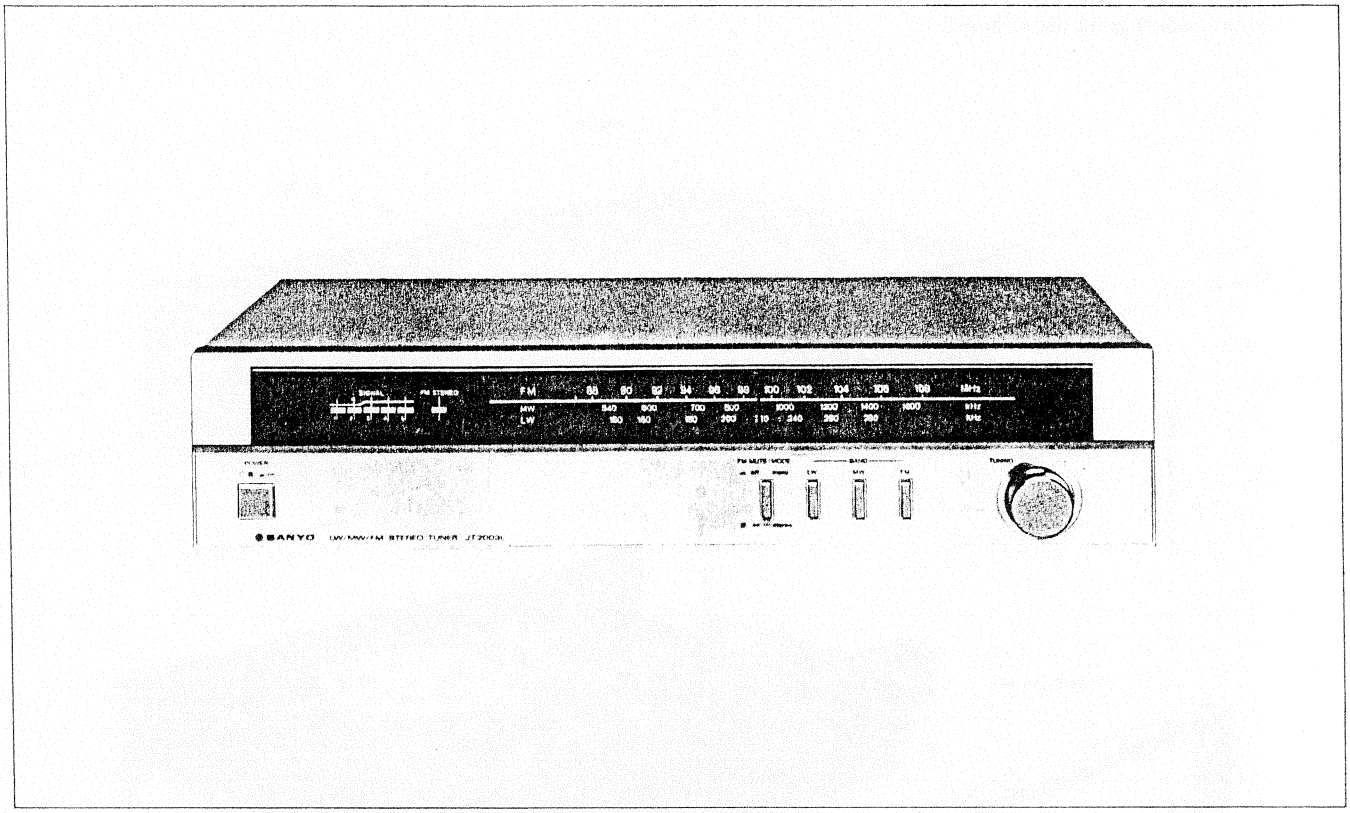
SERVICE MANUAL

STEREO TUNER

SANYO

JT 2003L

(EUROPE)



SPECIFICATIONS

NOTE:
The below mentioned specifications are mainly based on the IHF measurements standard. They can therefore not directly be compared with specifications based on the DIN standard or other standards.

FM section

Frequency range	87.5 – 108 MHz
Usable sensitivity	
Mono	1.2 μV
Signal to noise ratio (1 mV ANT.)	
Mono	70 dB
Stereo	65 dB
Harmonic distortion (1 kHz)	
Mono	0.2%
Stereo	0.25%
Frequency response	30 Hz – 15 kHz
Alternate channel selectivity	70 dB
AM suppression	55 dB
Stereo separation (1 kHz)	40 dB
Spurious rejection	60 dB
Image rejection	50 dB
IF rejection	85 dB
Aerial input	75 ohms unbalanced

AM (MW and LW) section

Frequency range	MW: 522 – 1620 kHz
	LW: 150 – 285 kHz
Sensitivity (ferrite aerial)	MW: 300 μV/m, LW: 500 μV/m
Signal to noise ratio (5 mV/m)	MW: 42 dB, LW: 40 dB
Selectivity	28 dB
Image rejection	MW: 50 dB, LW: 40 dB
IF rejection	39 dB
Aerial	Ferrite bar aerial and external aerial socket

General

Power requirements	AC: 220 V, 50 Hz
Power consumption	11 W
Dimensions (Approx.)	420 (W) x 250 (D) x 88 (H) mm
	(16-1/2" x 9-13/16" x 3-1/2")
Weight (Approx.)	3.5 kg (7 lbs. 11 ozs.)

* Specifications subject to change without notice.

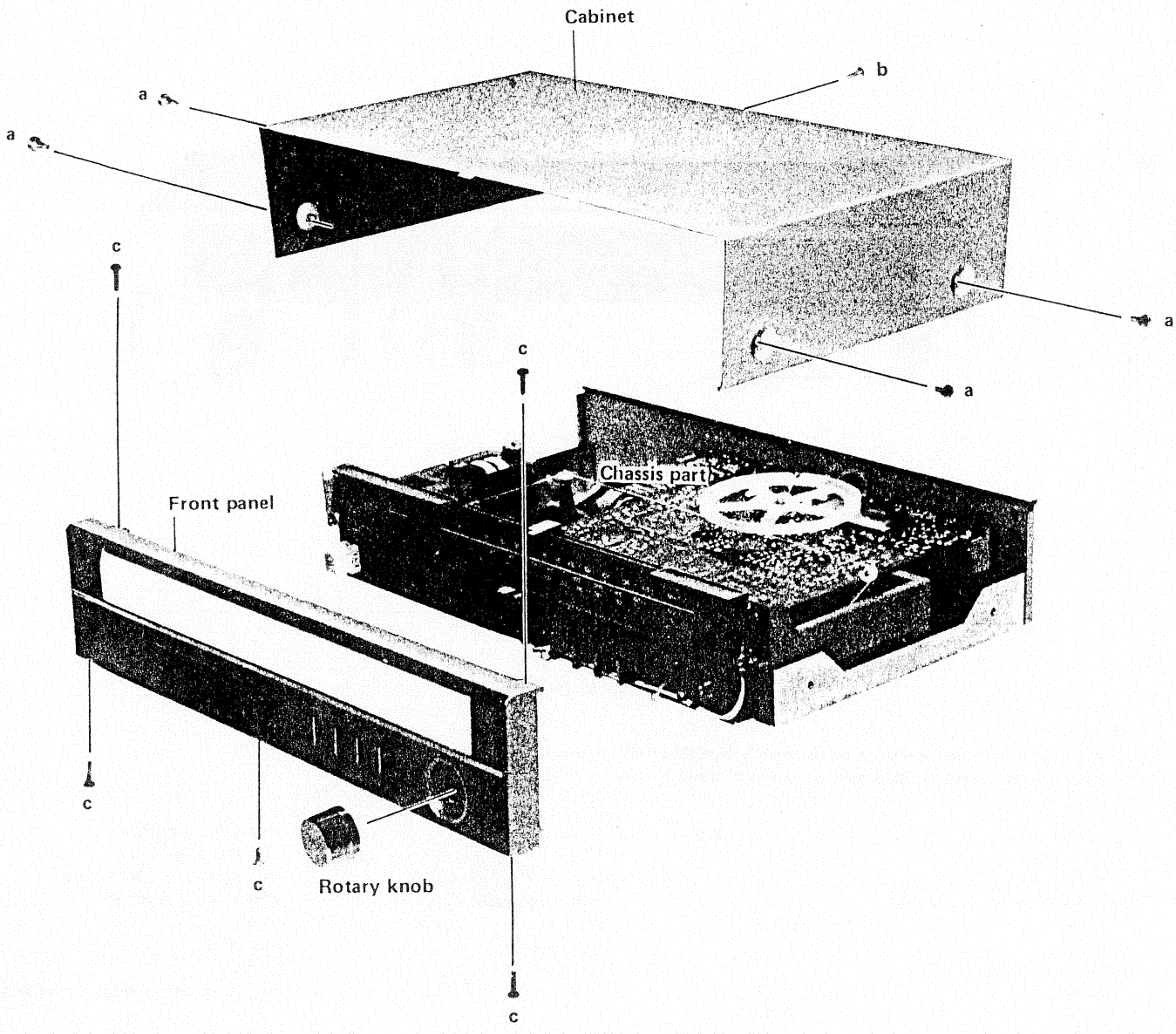
How to Remove the Panel

Pull out the power cord from outlet.

1. Cabinet
   Remove four screws "a" (binding head tapping screw 4 x 8 mm) and "b" (binding head tapping screw 3 x 8 mm) securing the cabinet.
   Lift the cabinet, and take it down.
2. Front panel
   Pull out rotary knob.
   Remove five screws "c" (binding head tapping screw 3 x 12 mm) securing the front panel.

Fitting of front panel

1. Set all push buttons in the OFF state.
2. Put push buttons into button holes of front panel in turn from the POWER switch button side. If a button does not go into the front panel hole, move the joint of the pertinent button to agree it with front panel hole.



a: Binding Head Tapping Screw 4 x 8 mm
b: Binding Head Tapping Screw 3 x 8 mm
c: Binding Head Tapping Screw 3 x 12 mm

Tuner Adjustment

- Apply 220 V AC, 50 Hz as power source.

AM • Set band selector to MW or LW.

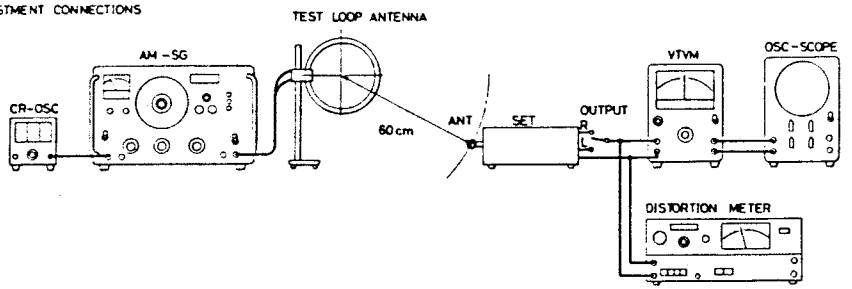
Standard modulation frequency MW: 1000 Hz
LW: 400 Hz

Percentage modulation 30%

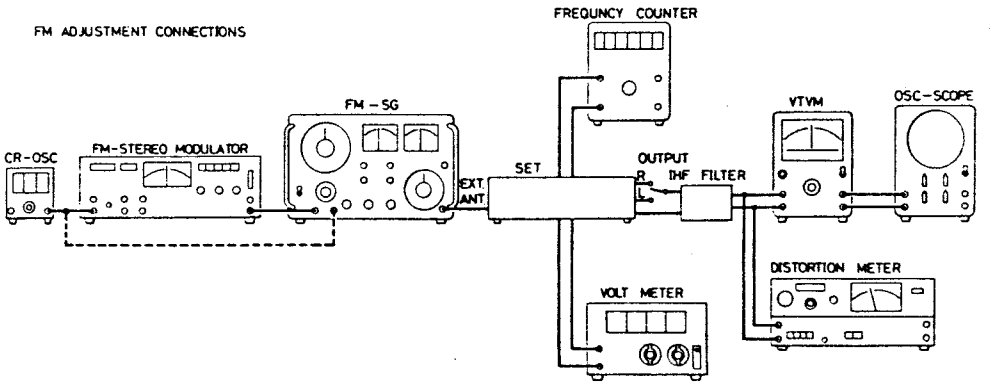
Step	Adjustment circuit		Position of tuning dial	Input conditions for measuring instrument: Measuring instrument (Frequency)	Input strength	Connecting point	Output conditions for measuring instrument: Measuring instrument	Connecting point: Hot side	Connecting point: Earth side	Adjustment	Adjustment procedure
1	IF (MW)		Low end (Where no incoming signals.)	AM Sweep generator 460 kHz (Non modulation)	Should be no distortion immediately before signals are saturated.	TP151 (H) TP102 (E) & AM Loop antenna	Oscilloscope AC Vacuum-tube Volt-meter Distortion meter	R262	TP203	T151 T251 T252	• Adjust to the minimum distortion with the output being at the maximum.
2	LW Cover frequency	Low	140 kHz	AM Signal generator 140 kHz	Proper	AM Loop antenna	Oscilloscope AC Vacuum-tube Volt meter Distortion meter	OUTPUT Terminal		L153	• Tune in SG and the unit, and adjust to the minimum distortion with the output being at the maximum.
		High	300 kHz	AM Signal generator 300 kHz						CT153	
3	LW Tracking	Low	160 kHz	AM Signal generator 160 kHz	Proper	AM Loop antenna	Oscilloscope AC Vacuum-tube Volt meter Distortion meter	OUTPUT Terminal		L155	• Tune in SG and the unit, and adjust to the minimum distortion with the output being at the maximum.
		High	280 kHz	AM Signal generator 280 kHz						CT151	
4	MW Cover frequency	Low	510 kHz	AM Signal generator 510 kHz	Proper	AM Loop antenna	Oscilloscope AC Vacuum-tube Volt meter Distortion meter	OUTPUT Terminal		L154	• Tune in SG and the unit, and adjust to the minimum distortion with the output being at the maximum.
		High	1650 kHz	AM Signal generator 1650 kHz						CT154	
5	MW Tracking	Low	600 kHz	AM Signal generator 600 kHz	Proper	AM Loop antenna	Oscilloscope AC Vacuum-tube Volt meter Distortion meter	OUTPUT Terminal		L152	• Tune in SG and the unit, and adjust to the minimum distortion with the output being at the maximum.
		High	1400 kHz	AM Signal generator 1400 kHz						CT152	
6	Signal indicator		Near 1000 kHz	AM Signal generator 1000 kHz	110 dB	AM Loop antenna	Signal LED	–		SVR251	• Adjust until the fifth LED is lit.

NOTES
1. Adjust in the numerical order of steps; otherwise specified performance may not be obtained.
2. Adjust on an iron plate.
3. Since the tracking adjustment of LW may deviate the cover frequency, adjust the both characteristics at the same time.
4. Use nonmetallic screwdriver for adjustment.
5. L152 and L155 are secured with paraffin. Melt and rotate.

AM ADJUSTMENT CONNECTIONS



FM ADJUSTMENT CONNECTIONS



FM • Set band selector to FM.

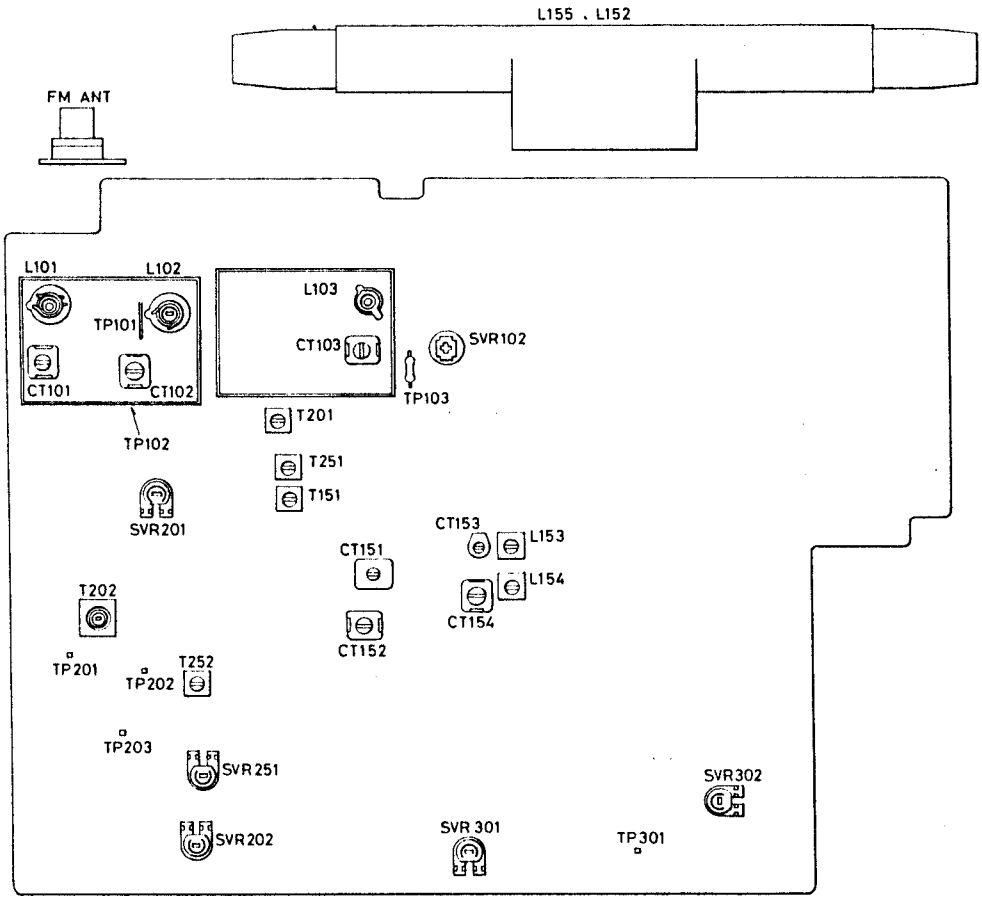
Standard modulation frequency, 1000 Hz;
frequency deviation, ±40 kHz dev.

Step	Adjustment circuit		Position of tuning dial	Input conditions for measuring instrument			Output conditions for measuring instrument			Adjustment	Adjustment procedure
				Measuring instrument (Frequency)	Input strength	Connecting point	Measuring instrument	Connecting point			
								Hot side	Earth side		
1	IF	V curve	Low end (Where no incoming signals.)	FM Sweep generator 10.7 MHz* (Non modulation)	Low Input level	TP-101 (H), TP-102 (E).	Oscilloscope AC Vacuum-tube Volt-meter Distortion meter	TP202	TP203	T201	• * Match the frequency with the center of ceramic filter. • Before adjusting, remove the ceramic capacitor of C216 (0.022μF), and keep it clear while adjusting; solder it again after adjustment.
		S curve						TP201	TP203	T202	• Adjust the S-curve to the IF center. • Keep muting switch in OFF position.
2	Cover frequency	Varactor Voltage	Low end	–	–	–	Digital Volt meter	TP103	TP102	SVR102	• Adjust to obtain 3.0V read on volt meter.
		High	High end	FM Signal generator 108.3 MHz	Proper	External FM-Antenna (75 ohm)	Oscilloscope AC Vacuum-tube Volt meter Distortion meter	OUTPUT Terminal		CT103	• Adjust until the distortion factor becomes minimum with the output value the maximum.
		Low	Low end	FM Signal generator 87.4 MHz	Proper					L103	

3	Tracking	Low	90.0 MHz	FM Signal generator 90.000 MHz	Proper	External FM-Antenna (75 ohm)	Oscilloscope V.T.V.M Distortion meter	OUTPUT Terminal	L101 L102	• Tune in SG and the unit, and adjust so that the distortion factor becomes minimum at the maximum output value. (Manual)
		High	106.0 MHz	106.000 MHz	Proper				CT101 CT102	• Tune in SG and the unit, and adjust so that the distortion factor becomes minimum at the maximum output value. (Manual)
4	Distortion		Near 98.0 MHz	98.0 MHz (Non modulation)	60 dB	External FM-Antenna (75 ohm)	Oscilloscope V.T.V.M Distortion meter	OUTPUT Terminal	T201 T202	• Tune in SG and the unit in the vicinity of 98 MHz. To determine the tuning point, adjust the output of SG so that the distortion factor of the tuner output becomes 3 to 10%, and select a point where the waveform distorts identically in vertical direction. • Set the SG output to 60 dB, and turn T202 until the distortion is minimized. • If the distortion factor does not decrease, turn T201 slightly. In this case, do not turn it too much; otherwise the characteristics may not be attained. • Tune in again, and make sure the tuning deviation is within ±15 kHz.
5	MPX (VCO)		–	SG (Cut OFF) FM noise off limit	–	External FM-Antenna (75 ohm)	Frequency Counter	TP301	TP203	SVR302	• Adjust to obtain 19 kHz ±30 Hz on frequency counter of high input impedance. • FM MUTE/MODE switch to "on" position.
6	MPX (Separation)		Near 98.0 MHz	FM Signal Generator 98 MHz Stereo Modulator	66 dB	External FM-Antenna (75 ohm)	Osilloscope V.T.V.M Distortion meter	OUTPUT Terminal		SVR301	• Measure the voltage leakage for each channel separately and adjust for optimum separation and balance.
7	Muting		Near 98.0 MHz	98.0 MHz	25 dB	External FM-Antenna (75 ohm)	Oscilloscope V.T.V.M	OUTPUT Terminal		SVR201	• Receive in the vicinity of 98 MHz in FM, and adjust so that the muting is effective at the SG direct open graduation of 20 dB.
8	Signal indicator		Near 98.0 MHz	98.0 MHz	55 dB	External FM-Antenna (75 ohm)	Signal LED	OUTPUT Terminal		SVR202	• Adjust until the fifth LED is lit.

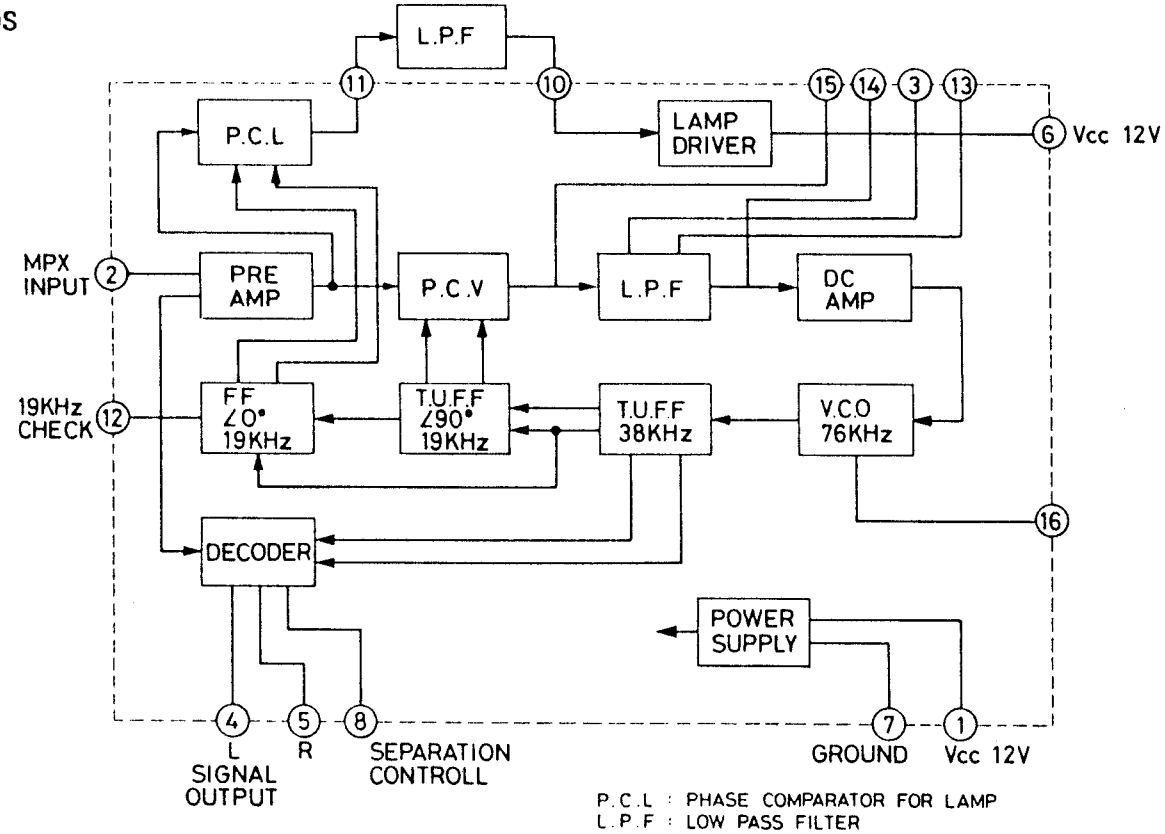
NOTES
1. The IF in item 4 refers to IF adjustment with SG, and is effective only when cover frequency and tracking are correctly adjusted.
2. Insert 75-ohm unbalanced dummy between SG and external FM antenna (75-ohm).
3. SG is directly connected and calibrated in open graduations.
4. Adjust the covery frequency precisely, and repeat IF and tracking adjustment two or three times.
5. Adjust on an iron plate.
6. Use nonmetallic screwdriver for adjustment.

PARTS LOCATION



IC BLOCK DIAGRAM

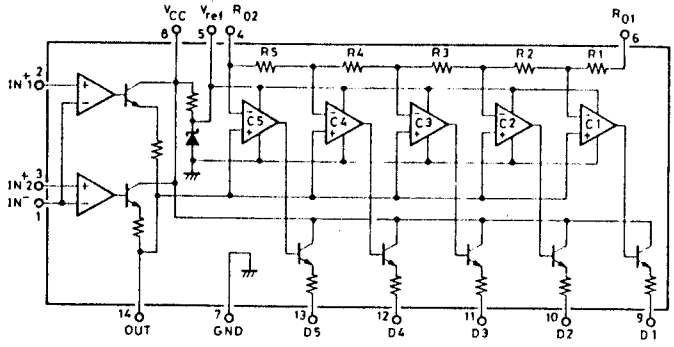
LA3350S

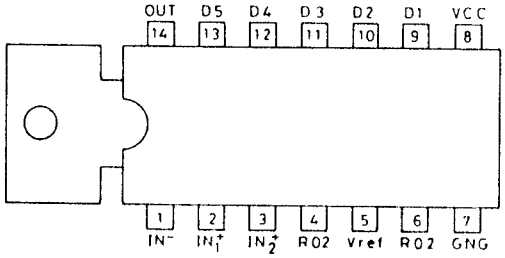


(PLL FM Multiplex Stereo Demodulator)

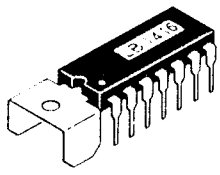
P.C.L : PHASE COMPARATOR FOR LAMP
L.P.F : LOW PASS FILTER
P.C.V : PHASE COMPARATOR FOR V.C.O
V.C.O : VOLTAGE CONTROLLED OSCILLATOR
T.U.F.F : DIRECT COUPLED TYPE FLIP-FLOP

LB1416 (5 DIGITS LEVEL METER DRIVER)

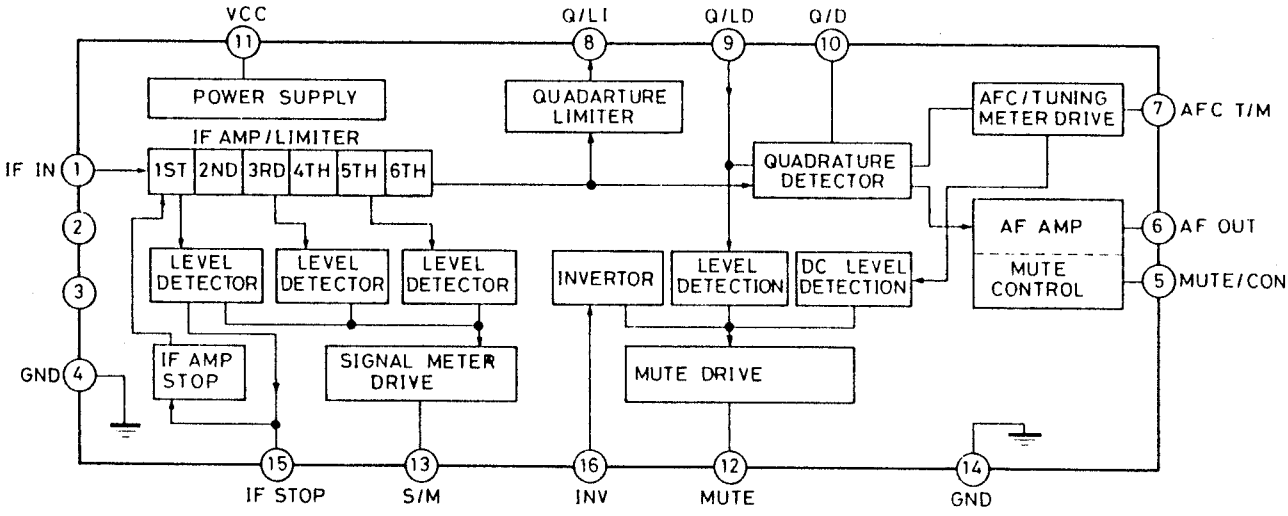


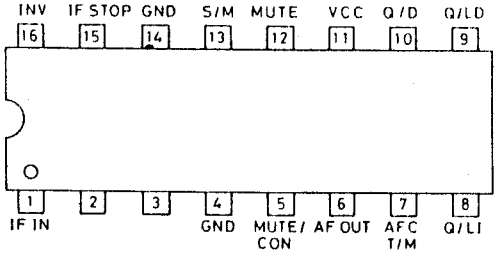


(TOP VIEW)

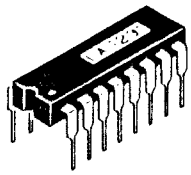


LA 1231 (FM IF SYSTEM)

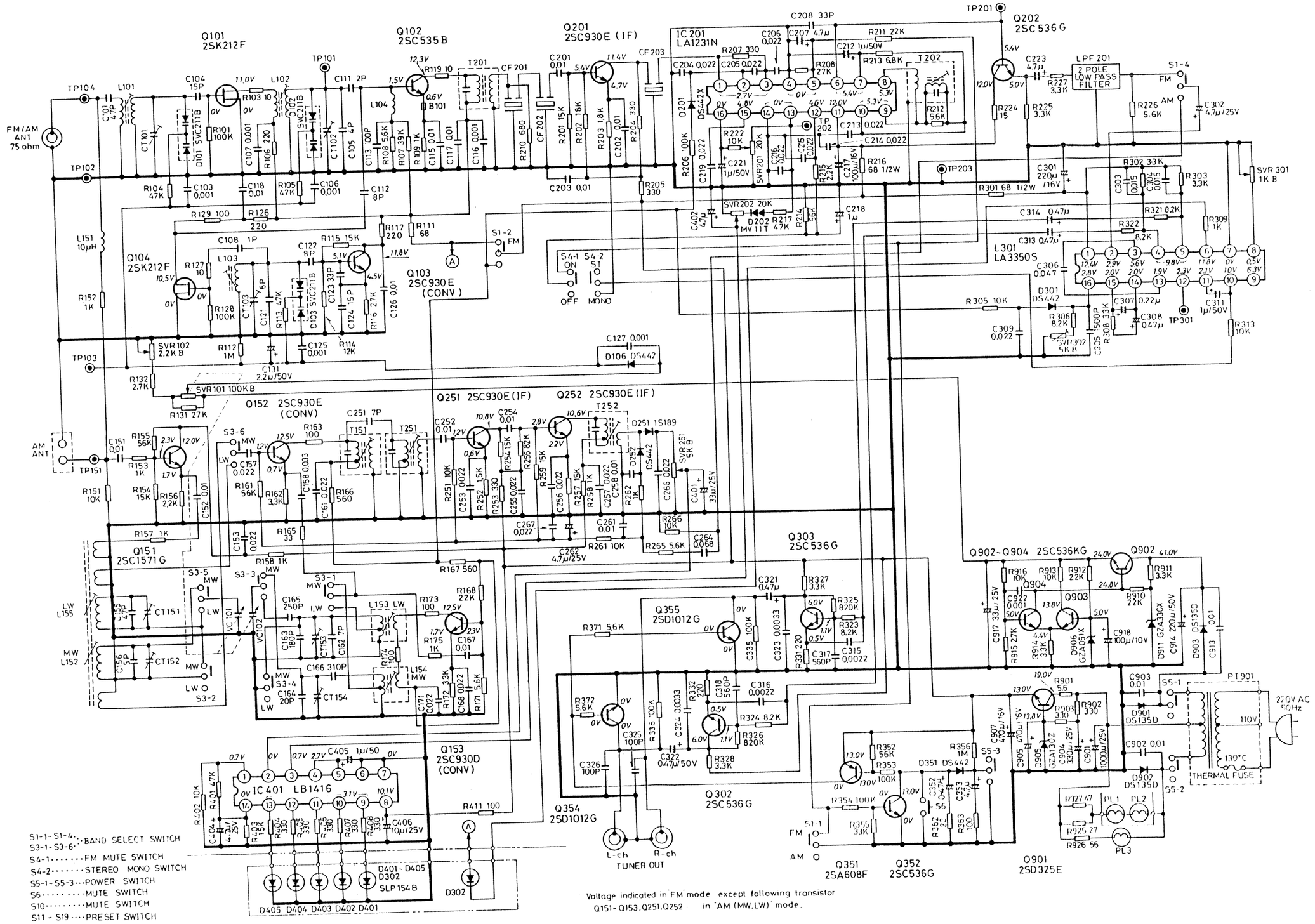




(TOP VIEW)

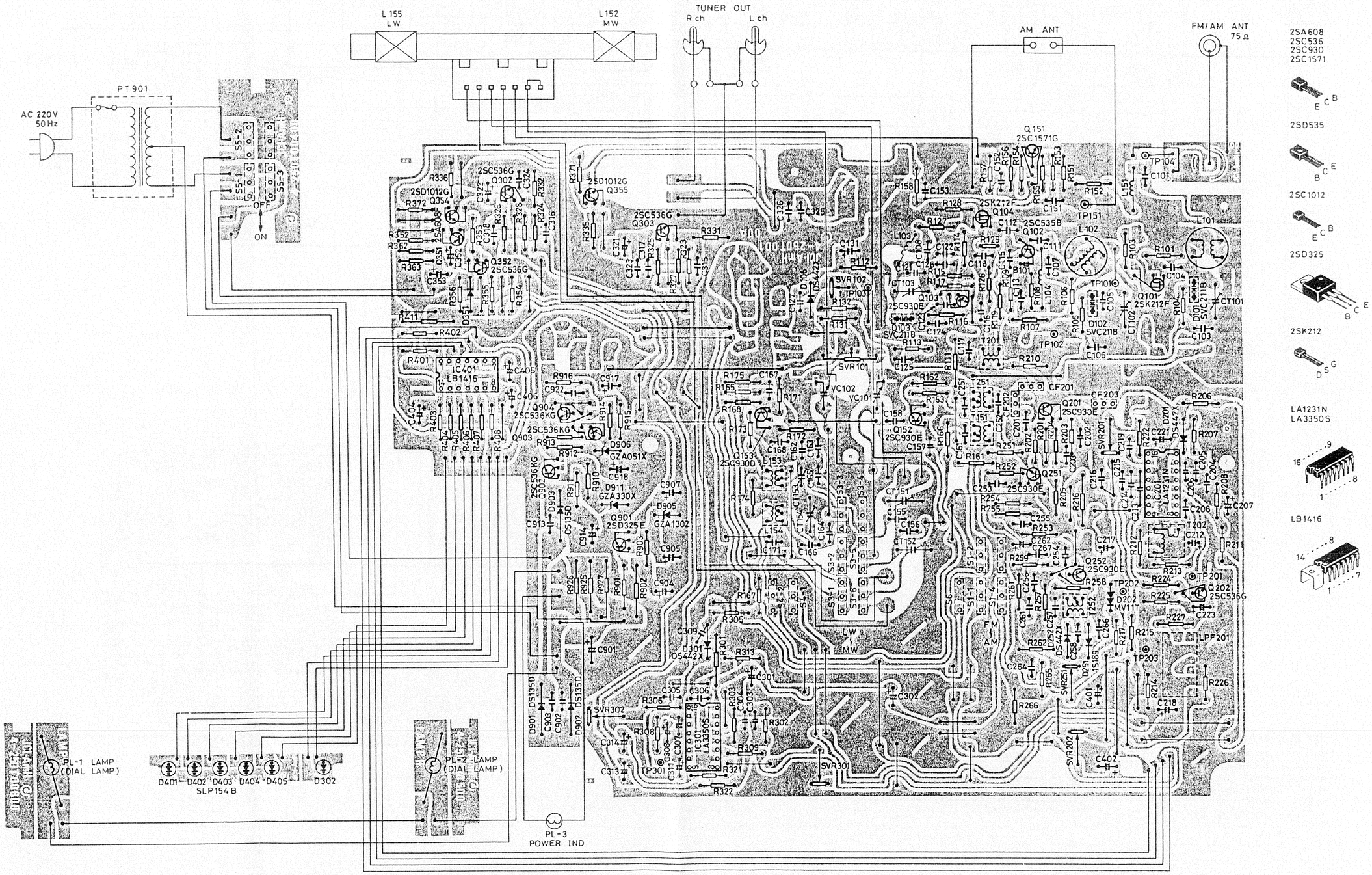


SCHEMATIC DIAGRAM



S1-1-S1-4···BAND SELECT SWITCH
S3-1-S3-6···
S4-1·····FM MUTE SWITCH
S4-2·····STEREO MONO SWITCH
S5-1-S5-3···POWER SWITCH
S6·····MUTE SWITCH
S10·····MUTE SWITCH
S11 - S19····PRESET SWITCH

Voltage indicated in "FM" mode except following transistor
Q151-Q153, Q251, Q252 in "AM (MW, LW)" mode.


L 155
LW
L152
MW
TUNER OUT
R ch
L ch
AM ANT
FM/AM ANT
75Ω
PT 901
AC 220V
50Hz
SS-1
SS-2
SS-3
OFF
ON
2SA608
2SC536
2SC930
2SC1571
2SD535
2SC1012
2SD325
2SK212
LA1231N
LA3350S
LB1416
Q151
2SC1571G
2SC536G
Q302
2SD1012G
Q354
Q355
2SC536G
Q303
2SC536G
Q352
2SC536G
2SD1012G
Q355
2SC536KG
Q904
2SC536KG
Q903
2SC536KG
Q902
Q901
2SD325E
2SK212F
Q104
2SC535B
Q102
2SC930E
Q103
2SC930E
Q153
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Q152
2SC930E
Q251
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Q252
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SVR302
VC101
VC102
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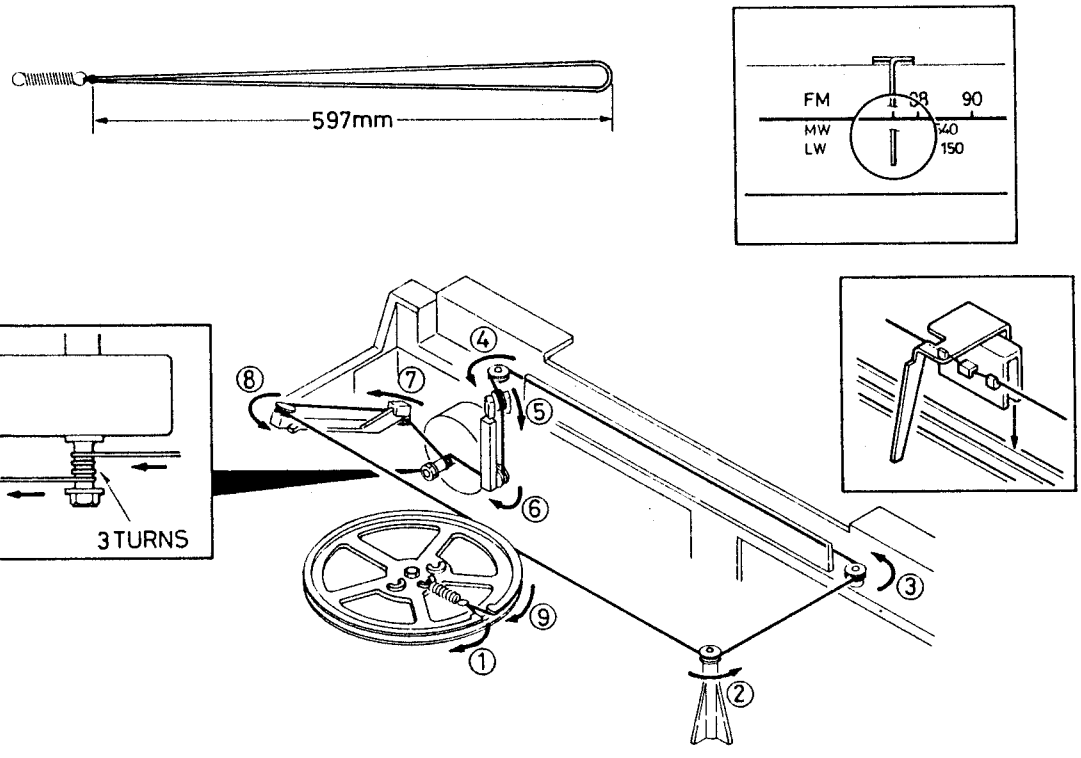
D301
DS442X
D401
DS135D
D902
DS135D
D903
DS135D
D901
DS135D
D201
DS442X
D252
DS442X
D251
1S188
D102
SVC211B
D103
SVC211B
D001
SVC211B
CT101
CT102
CT103
CT151
CT152
CT153
CT154
CT201
CF201
CF202
CF203
T151
T201
T251
T252
LPF201
TP101
TP102
TP103
TP104
TP151
TP201
TP202
TP203
TP301
D202
MV11T
PL-1 LAMP
(DIAL LAMP)
PL-2 LAMP
(DIAL LAMP)
PL-3
POWER IND
D401 D402 D403 D404 D405 D302
SLP154B
FM
AM
LW
MW


597mm
FM
88
90
MW
540
LW
150
3 TURNS
①
②
③
④
⑤
⑥
⑦
⑧
⑨